

REMARKS

Foreign Priority

The acknowledgement, in the Office Action, of a claim for foreign priority under 35 U.S.C. § 119(a)-(d), and that the certified copy of the priority document has been received, is noted with appreciation.

Status Of Application

Claims 1-18 were pending in the application; the status of the claims is as follows:

Claims 1-11, 13, 16, and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,515,080 to Nakamura et al. (hereinafter "Nakamura") in view of U.S. Patent No. 6,317,189 B1 to Yuan et al. (hereinafter "Yuan").

Claim 15 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura in view of Yuan, and further in view of U.S. Patent No. 5,133,076 to Hawkins et al. (hereinafter "Hawkins").

Claims 12, 14, and 17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura and Yuan in view of U.S. Patent 5,757,365 to Ho (hereinafter "Ho").

New claims 19 - 30 have been added to provide a more adequate basis for protection of the invention.

Drawings

To date, no Notice of Draftsperson's Patent Drawing Review has been received. Applicants respectfully request receipt of this document when it becomes available. Please note that the original drawings filed in the patent application are "formal" drawings.

Claim Amendments

Claims 1, 3, 10, 15, and 16 have been amended to more particularly point out and distinctly claim the invention.

Claims 2, 4-9, 11-14, 17, and 18 have been amended to improve the grammar thereof, and claim 7 has also been amended to coincide with changes made to claim 3. These changes are not necessitated by the prior art and are unrelated to the patentability of the invention.

35 U.S.C. § 103(a) Rejections

The rejection of claims 1-11, 13, 16, and 18 under 35 U.S.C. § 103(a), as being unpatentable over Nakamura in view of Yuan, is respectfully traversed based on the following.

Claims 1, 2, 5, 6, 8-11, and 13

Claims 2, 5, 6, 8-11, and 13 depend, directly or indirectly, from claim 1. Therefore, the following discussion of claim 1 applies equally to claims 2, 5, 6, 8-11, and 13.

Claim 1, as amended, is directed towards a liquid crystal device comprising a liquid crystal display, a driving circuit, a power supply circuit, and a controller. With regard to the power supply unit, amended claim 1 specifically recites that it “supplies electric power to the driving circuit”, and with regard to the controller, amended claim 1 specifically recites that it “inactivates at least part of the power supply circuit after writing on the liquid crystal display.”

Nakamura is directed towards a liquid crystal display (LCD) controller 24 that includes a timer 81 for counting a period of time between write operations. If the period of time exceeds a predetermined amount, the timer sends a sleep-state command to a VRAM controller 45. The VRAM controller 45 controls the transfer of image data from a

the position that is being written to on the LCD 37. When the VRAM controller 45 receives the sleep-state command from the timer 81, the VRAM controller 45 disables the counters 85, 87, 89, and 91.

Nakamura also discloses a power supply circuit 30 which supplies electrical power to the LCD controller 24. However, Nakamura fails to disclose or suggest disabling any portion of the power supply circuit 30 as part of the sleep-state that results from the above-mentioned sleep-state command. Thus, with regard to amended claim 1, Nakamura fails to disclose or suggest “a controller which inactivates at least part of the power supply circuit after writing on the liquid crystal display.” In addition, as pointed out in the present Office Action, Nakamura fails to disclose an LCD with a reflective type liquid crystal with a memory effect. Therefore, since Nakamura fails to disclose or suggest all of the limitations of claim 1, Nakamura cannot render claim 1 obvious.

Yuan is directed towards a reflective-type liquid crystal display and provides no disclosure related to liquid crystal display controllers. Therefore, like Nakamura, Yuan fails to disclose or suggest “a controller which inactivates at least part of the power supply circuit after writing on the liquid crystal display.” Therefore, since Yuan fails to disclose or suggest all of the limitations of claim 1, Yuan cannot render claim 1 obvious.

With regard to the proposed combination of Nakamura and Yuan, as pointed out above, both Nakamura and Yuan fail to disclose or suggest “a controller which inactivates at least part of the power supply circuit after writing on the liquid crystal display.” Therefore, if one skilled in the art were to combine the teachings of Nakamura and Yuan, the resulting combination would still fail to disclose or suggest “a controller which inactivates at least part of the power supply circuit after writing on the liquid crystal display.” Thus, since the proposed combination of Nakamura and Yuan fails to disclose or suggest all of the limitations of claim 1, the proposed combination cannot render claim 1 obvious.

Since claims 2, 5, 6, 8-11 and 13 depend, directly or indirectly, from claim 1, none of Nakamura, Yuan, and the proposed combination thereof can render claims 2, 5, 6, 8-11, and 13 obvious for at least the reasons discussed above with regard to claim 1.

Claims 3, 4, and 7

Claim 3 has been amended and now recites the following:

A liquid crystal display device comprising:
a liquid crystal display which uses a reflective type liquid crystal with a memory effect;
a driving circuit which performs writing on the liquid crystal display;
a data processing unit which is connected to the driving circuit, the data processing unit incorporating at least one central processing unit; and
a controller which inactivates at least part of an internal circuit of the at least one central processing unit after writing on the liquid crystal display.

Although Nakamura discloses a device including two central processing units, namely, CPU 11 and a power control CPU 306, Nakamura does not disclose that these central processing units are inactivated during any stage of processing. Therefore, claim 3 is distinguished from Nakamura.

Similarly, Yuan does not disclose a controller which inactivates at least part of an internal circuit of at least one central processing unit after writing on the liquid crystal display.

Therefore, claim 3 is distinguished and nonobvious over each of Nakamura and Yuan, and any combination of the two.

Claim 4 and claim 7 each depends from claim 3. Therefore, claim 4 and claim 7 are distinguished and nonobvious over Nakamura and Yuan, whether they are taken singly or in combination.

Claims 16 and 18

Claim 18 depends from independent claim 16. Accordingly, the following discussion of claim 16 applies equally to claim 18.

Claim 16, as amended, is directed towards a method for driving a liquid crystal display device. The method of amended claim 16 includes a step of "inactivating at least part of a power supply circuit which supplies electric power to a driving circuit which performs writing on the liquid crystal display" after writing on the liquid crystal display.

As pointed out above, each of Nakamura, Yuan, and the proposed combination thereof fails to disclose or suggest "a controller which inactivates at least part of the power supply circuit after writing on the liquid crystal display." It is equally true that each of Nakamura, Yuan, and the proposed combination thereof fails to disclose or suggest a method of driving a liquid crystal device including "inactivating at least part of a power supply circuit which supplies electric power to a driving circuit which performs writing on the liquid crystal display." Therefore, none of Nakamura, Yuan, and the proposed combination thereof can render claim 16 obvious.

Since claim 18 depends from claim 16, none of Nakamura, Yuan, and the proposed combination thereof can render claim 18 obvious for at least the reasons discussed above with regard to claim 16.

Accordingly, it is respectfully requested that the rejection of claims 1-11, 13, 16 and 18 under 35 U.S.C. § 103(a), as being unpatentable over Nakamura in view of Yuan, be reconsidered and withdrawn.

Claim 15

The rejection of claim 15 under 35 U.S.C. § 103(a), as being unpatentable over Nakamura in view of Yuan and further in view of Hawkins, is respectfully traversed based on the following.

Claim 15, as amended, is directed towards a liquid crystal device comprising a liquid crystal display, a driving circuit, a power supply circuit, a controller, and a casing. With regard to the power supply unit, amended claim 15 specifically recites that it “supplies electric power to the driving circuit”, and with regard to the controller, amended claim 15 specifically recites that it “inactivates at least part of the power supply circuit after writing on the liquid crystal display.”

As pointed out above with regard to claim 1, both Nakamura and Yuan fail to disclose or suggest a controller that “inactivates at least part of the power supply circuit after writing on the liquid crystal display.” Since claim 15 also recites a controller that “inactivates at least part of the power supply circuit after writing on the liquid crystal display,” neither of Nakamura and Yuan can render claim 15 obvious.

Hawkins is directed towards a hand-held computer that includes a CPU 50, a liquid crystal display 12 and a display controller 64. Hawkins also discloses a system standby mode for the hand-held computer where, upon receiving a certain interrupt signal, the CPU 50 disables all other interrupts and saves the system state in a system RAM 67. However, Hawkins fails to disclose or suggest a controller that “inactivates at least part of the power supply circuit after writing on the liquid crystal display.” Therefore, since Hawkins fails to disclose or suggest all of the limitations of claim 15, Hawkins cannot render claim 15 obvious.

With regard to the proposed combination of Nakamura, Yuan, and Hawkins, as pointed out above each of Nakamura, Yuan, and Hawkins fails to disclose or suggest “a controller which inactivates at least part of the power supply circuit after writing on the liquid crystal display.” Therefore, if one skilled in the art were to combine the teachings of Nakamura, Yuan, and Hawkins, the resulting combination would still fail to disclose or suggest “a controller which inactivates at least part of the power supply circuit after writing on the liquid crystal display.” Thus, since the proposed combination of Nakamura, Yuan, and Hawkins fails to disclose or suggest all of the limitations of claim 15, the proposed combination cannot render claim 15 obvious.

Accordingly, it is respectfully requested that the rejection of claim 15 under 35 U.S.C. § 103(a), as being unpatentable over Nakamura in view of Yuan and further in view of Hawkins, be reconsidered and withdrawn.

Claims 12, 14, and 17

The rejection of claims 12, 14, and 17 under 35 U.S.C. § 103(a), as being unpatentable over Nakamura and Yuan and in view of Ho, is respectfully traversed based on the following.

Claims 12 and 14 depend from claim 1, and claim 17 depends from claim 16. Accordingly, a review of claims 1 and 16 is essential to an analysis of the Section 103 rejection of claims 12, 14, and 17.

As discussed above, claim 1, as amended, sets forth a controller that “inactivates at least part of the power supply circuit after writing on the liquid crystal display,” and claim 16, as amended, includes a step of “inactivating at least part of a power supply circuit which supplies electric power to a driving circuit which performs writing on the liquid crystal display.” As pointed out above, Nakamura and Yuan both fail to disclose or suggest a controller that “inactivates at least part of the power supply circuit after writing on the liquid crystal display” and both fail to disclose or suggest a step of “inactivating at least part of a power supply circuit which supplies electric power to a driving circuit which performs writing on the liquid crystal display.” As will be discussed below, Ho fails to correct these deficiencies.

Ho discloses a computer system having a low power consumption mode initiated by a power save controller 110. The power save controller 110 monitors update data for updating a display 18 of the computer system. When the power save controller 110 detects that no updates have been made to the display 18 for two full frames, the low power consumption mode is initiated. In the low power consumption mode, the power save controller 110 shuts down at least portions of a sequencer 86, a graphics controller 92, an attributes controller 94, and a look-up table 96 which are all part of a display

controller 14. However, Ho is silent with regard to shutting down all or part of a power supply circuit as part of the low power consumption mode. Thus, with respect to claim 1, Ho fails to disclose or suggest a controller that “inactivates at least part of the power supply circuit after writing on the liquid crystal display,” and with respect to claim 16, Ho fails to disclose or suggest a step of “inactivating at least part of a power supply circuit which supplies electric power to a driving circuit which performs writing on the liquid crystal display.” Therefore, since Ho fails to disclose or suggest all of the limitations of claims 1 and 16, Ho cannot render obvious claims 1 and 16, respectively.

With regard to the proposed combination of Nakamura, Yuan, and Ho, as pointed out above, each of these references fails to disclose or suggest a controller that “inactivates at least part of the power supply circuit after writing on the liquid crystal display” and each fails to disclose or suggest a step of “inactivating at least part of a power supply circuit which supplies electric power to a driving circuit which performs writing on the liquid crystal display.” Therefore, even if one skilled in the art were to consider combining the teachings of Nakamura, Yuan, and Ho, the resulting combination would still fail to disclose or suggest a controller that “inactivates at least part of the power supply circuit after writing on the liquid crystal display” and would also still fail to disclose or suggest a step of “inactivating at least part of a power supply circuit which supplies electric power to a driving circuit which performs writing on the liquid crystal display.” Therefore, since the proposed combination of Nakamura, Yuan, and Ho fails to disclose or suggest all of the limitations of claims 1 and 16, the proposed combination of Nakamura, Yuan, and Ho cannot render obvious claims 1 and 16, respectively.

Since claims 12 and 14 depend from claim 1, and claim 17 depends from claim 16, none of Nakamura, Yuan, Ho, and the proposed combination thereof can render claims 12, 14, and 17 obvious for at least the reasons discussed above with regard to claims 1 and 16.

Accordingly, it is respectfully requested that the rejection of claims 12, 14 and 17 under 35 U.S.C. § 103(a), as being unpatentable over Nakamura and Yuan and in view of Ho, be reconsidered and withdrawn.

New Claims

New claims 19-30 have been added to provide a more adequate basis for protection of the invention. No new matter has been added.

New claims 19 and 23-27 either directly or indirectly depend from claim 15, and are considered to be in condition for allowance for at least the same reasons discussed above with regard to claim 15.

New claim 20 depends from claim 16, and is considered to be in condition for allowance for at least the same reasons discussed above with regard to claim 16.

New claims 21 and 22 indirectly depend from claim 3, and are considered to be in condition for allowance for at least the same reasons discussed above with regard to claim 3.

The requirements for new claim 28 include “a controller which inactivates at least part of the power supply circuit and/or at least part of an internal circuit of the data processing unit after writing on the liquid crystal display, thereby inhibiting electric power supply to the liquid crystal display.” In contrast, in the Nakamura device, it is required that the liquid crystal is continuously driven even in sleep mode, and thus, Nakamura does not disclose or suggest a controller as required by claim 28. On the other hand, Yuan offers no teachings regarding liquid crystal display controllers. Therefore, like Nakamura, Yuan also fails to disclose a controller as required by claim 28. Therefore, claim 28 is distinguished and nonobvious over Nakamura and Yuan, whether each is taken singly or in combination with the other.

Similarly, each of the other cited references, namely, the Hawkins patent and the Ho patent fail to disclose or suggest “a controller which inactivates at least part of the power supply circuit and/or at least part of an internal circuit of the data processing unit after writing on the liquid crystal display, thereby inhibiting electric power supply to the

liquid crystal display.” Therefore, claim 28 is distinguished and nonobvious over any combination of any of the cited references.

New claims 29 and 30 depend from claim 28, and are distinguished from the cited references for at least the same reasons discussed above with regard to claim 28.

CONCLUSION

Wherefore, in view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are earnestly solicited.

This Amendment increases the total number of claims from eighteen to a total of thirty, increases the number of independent claims from three to a total of five, but not present any multiple dependency claims. Accordingly, a Response Transmittal and Fee Authorization form authorizing the amount of \$348.00 to be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260 is enclosed herewith in duplicate. However, if the Response Transmittal and Fee Authorization form is missing, insufficient, or otherwise inadequate, or if a fee, other than the issue fee, is required during the pendency of this application, please charge such fee to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260.

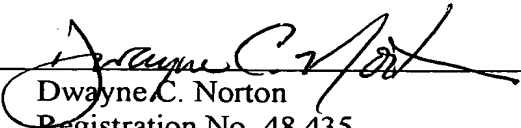
If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

Any other fee required for such Petition for Extension of Time and any other fee required by this document pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee,

and not submitted herewith should be charged to Sidley Austin Brown & Wood LLP's
Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

The following is a marked-up version of the changes to the claims which are being made in the attached response to the Office Action dated December 10, 2001.

IN THE CLAIMS:

1. (Once Amended) A liquid crystal display device comprising:
a liquid crystal display which uses reflective type liquid crystal with a memory effect;
a driving circuit which performs writing on the liquid crystal display;
~~a data processing unit which is connected to the driving circuit;~~
a power supply circuit which supplies electric power to the driving circuit ~~and the data processing unit;~~ and
a controller which inactivates at least part of the power supply circuit ~~and/or at least part of an internal circuit of the data processing unit~~ after writing on the liquid crystal display.
2. (Once Amended) ~~The~~ A liquid crystal display device according to claim 1, wherein:
the power supply circuit incorporates a booster circuit; and
the controller inactivates the booster circuit after writing on the liquid crystal display.
3. (Once Amended) ~~The~~ A liquid crystal display device comprising according to claim 1, wherein:
a liquid crystal display which uses reflective type liquid crystal with a memory effect;
a driving circuit which performs writing on the liquid crystal display;

a data processing unit which is connected to the driving circuit, the data processing unit ~~incorporates a~~ incorporating at least one central processing unit; and

the a controller which inactivates at least part of an internal circuit of the at least one central processing unit after writing on the liquid crystal display.

4. (Once Amended) ~~The~~ A liquid crystal display device according to claim 3, wherein the at least one central processing unit is capable of operating in a sleep mode to inactivate part of the internal circuit by itself after writing on the liquid crystal display.

5. (Once Amended) ~~The~~ A liquid crystal display device according to claim 1, not comprising a power switch for turning on and off a main power source.

6. (Once Amended) ~~The~~ A liquid crystal display device according to claim 1, wherein the liquid crystal display uses liquid crystal which exhibits a cholesteric phase.

7. (Once Amended) ~~The~~ A liquid crystal display device according to claim 3, wherein:
the data processing unit incorporates a plurality of central processing units; and
the controller also inactivates at least part of an internal circuit of at least one of the central processing units after writing on the liquid crystal display.

8. (Once Amended) ~~The~~ A liquid crystal display device according to claim 1, wherein unchangeable information is displayed on the liquid crystal display.

9. (Once Amended) ~~The~~ A liquid crystal display device according to claim 1, further comprising an operation section with which an user is capable of making an input, wherein writing on the liquid crystal display is carried out in accordance with the input made with the operation section.

10. (Once Amended) ~~The~~ A liquid crystal display device according to claim 9, wherein inactivation of at least part of the ~~internal circuit of the data processing unit~~ power

supply circuit is inhibited while an input is being continuously made with the operation section.

11. (Once Amended) ~~The~~ A liquid crystal display device according to claim 1, further comprising a receiving circuit which receives a signal from outside, wherein information about reception of a signal at the receiving circuit is displayed on the liquid crystal display.
12. (Once Amended) ~~The~~ A liquid crystal display device according to claim 1, wherein the controller inactivates at least part of the power supply circuit immediately after writing on the liquid crystal display.
13. (Once Amended) ~~The~~ A liquid crystal display device according to claim 1, wherein the controller inactivates at least part of the power supply circuit a specified time after writing on the liquid crystal display.
14. (Once Amended) ~~The~~ A liquid crystal display device according to claim 1, wherein the controller is capable of operating in a first mode to inactivate at least part of the power supply circuit immediately after writing on the liquid crystal display and in a second mode to inactivate at least part of the power supply circuit a specified time after writing on the liquid crystal display.
15. (Once Amended) A portable electronic device comprising:
 - a liquid crystal display which uses reflective type liquid crystal with a memory effect;
 - a driving circuit which performs writing on the liquid crystal display;
 - ~~a data processing unit which is connected to the driving circuit;~~
 - a power supply circuit which supplies electric power to the driving circuit ~~and the data processing unit;~~
 - a controller which inactivates at least part of the power supply circuit ~~and/or at least part of an internal circuit of the data processing unit~~ after writing on the liquid crystal display; and

a casing which encases the liquid crystal display, the driving circuit, ~~the data processing unit~~, the power supply circuit and the controller.

16. (Once Amended) A method for driving a liquid crystal display device provided with a liquid crystal display which uses reflective type liquid crystal with a memory effect, said method comprising the step of:

after writing on the liquid crystal display, inactivating at least part of a power supply circuit which supplies electric power to a driving circuit which performs writing on the liquid crystal display. ~~display and/or at least part of an internal circuit of a data processing unit which is connected to the driving circuit.~~

17. (Once Amended) The driving method according to claim 16, wherein at least part of the power supply circuit is inactivated immediately after writing on the liquid crystal display.

18. (Once Amended) The driving method according to claim 16, wherein at least part of the power supply circuit is inactivated a specified time after writing on the liquid crystal display.

Claims 19-30 have been added.